

# Digital nudges based on weather found to increase exercise

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Sending targeted digital nudges based on the weather can motivate health app users to increase their exercise and stay active over time, according to new University of Minnesota [research](#) published online in *Information*

*Systems Research* and co-authored by Jason Chan, associate professor in the Carlson School of Management.

Digital nudges, such as push alert messages, are common strategies used by [health](#) app companies to encourage users to stay engaged with fitness. However, research shows initial boosts in activity from nudges often lose their effectiveness over time. Noting the powerful impact weather has on moods, the researchers decided to examine if tailored messages based on current weather conditions could reverse this trend.

The researchers partnered with a health app company based in Asia for a series of field experiments to determine the best message framing to use in digital nudges for sunny and [cloudy weather](#) based on the app user's GPS data. Each message would ask the user to participate in a 10,000-step walking challenge. However, a gain-framed message would focus on the [health benefits](#) of exercise, while a loss-framed message would focus on how lack of exercise increases certain health risks.

The researchers determined:

- During sunny weather, loss-framed messages focused on [health risks](#) were the most effective in increasing users' exercise.
- During cloudy weather, gain-framed messages focused on health benefits were the most effective in increasing users' exercise.
- The tailored weather messages continued to resonate with users over time, as seen when the researchers repeated the nudges four times over a 55-day period.

"Mobile health apps represent a multi-billion industry, with over 500 million active users," noted Chan. "Our findings can help inform these companies on how to integrate weather-based designs into their products and better motivate their users to keep active and healthy."

Chan says the optimal message pairings support a theory called "mood as a resource." Existing research shows [sunny weather](#) tends to cause a good mood, while the opposite is often true for dark, cloudy weather. "Mood as a resource" suggests that when someone is in a bad mood, positive framing may perk them up so they're more ready to accept a suggestion. Conversely, someone in a good mood may need some warnings to serve as an attention point for them to take action.

"We chose to frame the messages with health consequences because we wanted them to connect strongly with the app users," explained Chan. "People care about their health and we wanted them to consider the positive or negative [health consequences](#) through the message they received."

Additionally, the researchers found the "[mood](#) as a resource" pairings (sunny-loss and cloudy-gain) were more effective for users with a lower exercise level and those living in lower-income areas. These pairings also resonated with those who used the app to achieve health goals such as losing weight.

Conversely, a small subset of users who used the app to enjoy [exercise](#) were actually better served with the opposite weather-messaging format (sunny-gain and cloudy-negative). Chan says this nuance shows how digital nudges based on [weather](#) can be adapted to connect different audiences.

**More information:** Nakyung Kyung et al, Contextual Targeting in mHealth Apps: Harnessing Weather Information and Message Framing to Increase Physical Activity, *Information Systems Research* (2023). [DOI: 10.1287/isre.2020.0119](https://doi.org/10.1287/isre.2020.0119)

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